



Massachusetts Department of Environmental Protection Source Water Assessment and Protection (SWAP) Report For Gill Elementary School

What is SWAP?

The Source Water Assessment and Protection (SWAP) program, established under the federal Safe Drinking Water Act, requires every state to:

- ? Inventory land uses within the recharge areas of all public water supply sources;
- ? Assess the susceptibility of drinking water sources to contamination from these land uses; and
- ? Publicize the results to provide support for improved protection.

SWAP and Water Quality

Susceptibility of a drinking water source does *not* imply poor water quality. Actual water quality is best reflected by the results of regular water tests.

Water suppliers protect drinking water by monitoring for more than 100 chemicals, treating water supplies, and using source protection measures to ensure that safe water is delivered to the tap.

Prepared by the
Massachusetts Department of
Environmental Protection,
Bureau of Resource Protection,
Drinking Water Program

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Table 1: Public Water System (PWS) Information

PWS NAME	Gill Elementary School
PWS Address	48 Boyle Road
City/Town	Gill, Massachusetts
PWS ID Number	1106004
Local Contact	Mr. William Barton
Phone Number	800-340-6041

Well Name	Source ID#	Zone I (in feet)	IWPA (in feet)	Source Susceptibility
Well No. 1	1106004-01G	112	427	High

Introduction

We are all concerned about the quality of the water we drink. Drinking water supplies may be threatened by many potential sources of contamination, including septic systems, road deicing, and improper disposal of hazardous materials. Citizens and local officials can work together to better protect these drinking water sources.

Purpose of this report:

This report is a planning tool to support local and state efforts to improve water supply protection. By identifying land uses within water supply protection areas that may be potential sources of contamination, the assessment helps focus protection efforts on appropriate best management practices (BMPs) and drinking water source protection measures. Department of Environmental Protection (DEP) staff are available to provide information about funding and other resources that may be available to your community.

This report includes:

1. Description of the Water System
2. Discussion of Land Uses in the Protection Areas
3. Protection Recommendations
4. Attachments, including a Map of the Protection Areas

1. Description of the Water System

The Gill Elementary School is located in the small, rural town of Gill, in western Massachusetts near the Vermont border. The school has a student and staff population of approximately 160 people. There are no municipal water or wastewater systems in Gill, therefore, the school is served by one on-site water supply well and on-site septic disposal system. The well for the school is located east of the school on the edge of the field, just in the woods. The school reports that the well is an 8-inch diameter, gravel developed well approximately 81 feet deep. The well has 5-feet of screen and 76 feet of casing. In 1989, the school raised the well casing above grade to address chronic bacteria problems associated with water inundating the casing. The original well for the school is immediately west, in front of the school. That well is not used.

What is a Protection Area?

A well's water supply protection area is the land around the well where protection activities should be focused. Each well has a Zone I protective radius and an Interim Wellhead Protection Area (IWPA).

- **The Zone I** is the area that should be owned or controlled by the water supplier and limited to water supply activities.
- **The IWPA** is the larger area that is likely to contribute water to the well.

In many instances the IWPA does not include the entire land area that could contribute water to the well. Therefore, the well may be susceptible to contamination from activities outside of the IWPA that are not identified in this report.

What is Susceptibility?

Susceptibility is a measure of a well's potential to become contaminated due to land uses and activities within the Zone I and Interim Wellhead Protection Area (IWPA).

The area is on the edge of the Connecticut River valley at the base of the Berkshire foothills. The surficial geology at the school itself is thin but deepens somewhat to the east into the Ashuela Brook valley. The deposits deepen to the east of the school and are mapped as glacial outwash deposits associated with Glacial Lake Hitchcock. There is no record of the materials encountered during drilling but geologic mapping indicates fine materials interbedded or overlying coarse materials. Recent alluvium covers the area near the brook. The bedrock is mapped as the Mount Toby Formation, a sedimentary conglomerate rock. There is no empirical evidence of a protective clay layer or thick till to prevent activities on the ground surface from threatening the water supply. Therefore, the aquifer is identified as having a high vulnerability to contamination due to the absence of hydrogeologic barriers that can prevent contaminant migration. Please refer to the attached map of the Zone I and IWPA.

The Zone I is the area immediately around the well that is most vulnerable. The Zone I for a well is the protected area immediately surrounding the wellhead while the Interim Wellhead Protection Area (IWPA) provides an interim protection area for a water supply well when the actual recharge area (Zone II) has not been delineated. The actual recharge area to the well may be significantly larger or smaller than the IWPA. The DEP allows only activities related to supplying water or other non-threatening activities within the Zone I. Many systems that were developed prior to the DEP requirements are grandfathered, but any expansion or changes to the system require DEP approval and compliance with Zone I restrictions. Well #1 has a Zone I radius of 112 feet and an IWPA radius of 427 feet. The Zone I was based on the maximum daily water use as determined from metered water data reported on a monthly basis.

The protection areas for the school include very few activities that pose a risk of contamination. However, there are activities that are just outside of the protection areas that may pose a significant threat to the well if not managed. There is an active cornfield within the IWPA. The farmer maintains a 150-foot buffer area along the edge of the field closest to the well where he does not apply herbicides. The septic system, the school and the underground storage tank for the fuel oil are located immediately outside of the IWPA. If funding becomes available, the school may wish to consider delineating the Zone II recharge area for the well so that the protection strategy for the well can be more focused.

The well serving the school has no treatment at this time. The DEP requires public water

Table 2: Table of Activities within the Water Supply Protection Areas

Potential Contaminant Sources	Zone I	IWPA	Threat	Comments
Non-conforming Zone I	-	-	-	Contact DEP prior to expanding the system or conducting any work in the Zone I.
Fuel oil underground storage/floor drain in boiler room	-	-	Moderate /High	Spills, leaks, or improper handling of fuel oil from school discharged through floor drain
Floor drains in boiler room	No	Yes	Moderate	Potential release of oil to the ground in the IWPA.
Septic Systems	-	-	-	Nitrates, microbial contaminants, and improper disposal of hazardous chemicals
School – lawn care	No	Yes	Moderate	Continue policy of not using pesticides and fertilizers
Pesticide and fertilizer use	No	Yes	High	Pesticide and fertilizer: improper handling/application

* -For more information on Contaminants of Concern associated with individual facility types and land uses please see the SWAP Draft Land Use / Associated Contaminants Matrix on DEP's website - www.state.ma.us/dep/brp/dws/.

Glossary

Zone I: The area closest to a well; a 100 to 400 foot radius proportional to the well's pumping rate. To determine your Zone I radius, refer to the attached map.

IWPA: A 400-foot to ½ mile radius around a public water supply well proportional to its pumping rate; the area DEP recommends for protection in the absence of a defined Zone I I. To determine IWPA radius, refer to the attached map.

Zone II: The primary recharge area defined by a hydrogeologic study.

Aquifer: An underground water-bearing layer of permeable material that will yield water in a usable quantity to a well.

Hydrogeologic Barrier: An underground layer of impermeable material that resists penetration by water.

Recharge Area: The surface area that contributes water to a well.

suppliers to monitor the quality of the water. For current information on monitoring results and treatment, please contact the Public Water System contact person listed above in Table 1. Drinking water monitoring reporting data is also available on the web via EPA's Envirofacts website at http://www.epa.gov/enviro/html/sdwis/sdwis_query.html.

2. Discussion of Land Uses in the Protection Areas

There are few land uses and activities within the drinking water supply protection areas that are potential sources of contamination.

Key issues include:

1. **Non-conforming Zone I;**
2. **Floor drain in the boiler room**
3. **Elementary School;**
4. **Fuel oil storage; and**
5. **Agricultural use.**

The overall ranking of susceptibility to contamination for the wells is high, based on the presence of at least one high threat land use or activity in the IWPA, as seen in Table 2.

1. Non-conforming Zone I – Currently, the well does not meet DEP's restrictions, which require the system to own or control the entire Zone I area and allow only water supply related or other non-threatening activities in Zone I. The school's Zone I contains only passive recreation (ball field) and a wooded wetland. However, the school does not own and/or control all land encompassed by the Zone 1. Systems not meeting DEP Zone I requirements must get DEP approval and address Zone I issues prior to increasing water use or modifying systems.

Recommendations:

- ✓ Do not allow any non-water supply activities in the Zone I.
- ✓ Locate the floor drain discharge location.

2. Floor Drains in Boiler Room – There is a sump pump and floor drain in the boiler room. The discharge point could not be exactly located during the assessment but it was believed to be to a surface discharge east of the school in the wooded area. It could not be determined if the discharge was in the Zone I or the IWPA. Title 5 prohibits disposal

of any wastewater other than sanitary waste to a septic system and the UIC regulations prohibit dry wells in areas where hazardous materials or petroleum may enter the floor drain. Contact the UIC coordinator to discuss compliance. If an accidental release occurred through the floor drain it may pose a threat to the well. It may be necessary to have the floor drain and sump pump to prevent groundwater from flooding the basement and it may be unreasonable to have the drain discharge to a tight tank. However, the floor drain must be protected to prevent boiler blow down, oil or other prohibited discharges through the floor drain.

Recommendations:

- V Be sure that the floor drains are in compliance with Department Regulations (refer to Industrial Floor Drain Brochure attached).
- ♦ Contact the UIC coordinator for the Western Region Office of the Department (Rick Larson 413-755-2207 or Tony Zaharias 413-755-2122).

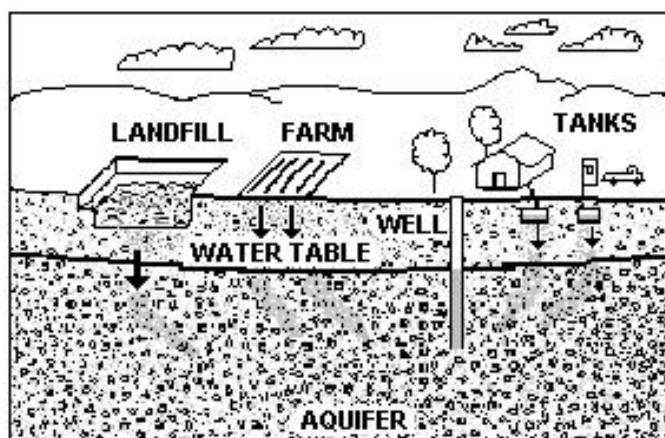


Figure 1: Example of how a well could become contaminated by different land uses and activities.

For More Information:

Contact Catherine Skiba in DEP's Springfield Office at (413) 755-2119 for more information and for assistance in improving current protection measures.

More information relating to drinking water and source protection is available on the Drinking Water Program web site at:

www.state.ma.us/dep/brp/dws/

Additional Documents:

To help with source protection efforts, more information is available by request or online at www.state.ma.us/dep/brp/dws/, including:

1. Water Supply Protection Guidance Materials such as model regulations, Best Management Practice information, and general water supply protection information.
2. MA DEP SWAP Strategy
3. Land Use Pollution Potential Matrix
4. Draft Land/Associated Contaminants Matrix

Copies of this assessment have been made available to the public water supplier and town boards.

- ✓ Containment of the fuel system to prevent accidental releases to the floor drain may be an option. Contact the regional DEP contact for the UIC program listed above. Oil lines from the tank to the boiler may be sleeved so that any leaks would drain back to the tank or minimal oil would leak to the boiler room. Prepare a policy and a plan for maintenance operations, especially when oil filters are changed. DEP recommends that you require that your boiler maintenance contractor use containment, protect the drain and have absorbent materials on hand to prevent accidental leaks while conducting routine maintenance. The contractor should be responsible for the off-site disposal of any boiler blow down generated during maintenance.
- ✓ Seal all cracks in the floor and the floor drain if it cannot be adequately protected to prevent a prohibited discharge.

3. School facilities and athletic fields - Middle schools generally use only household hazardous materials for cleaning. There are state and federal regulations controlling some of the activities and products used at schools to promote "healthy schools". None of the school's facilities are located within the Zone I or IWPA of the wells. However, the facilities are just outside of the protection areas.

Recommendations:

- ✓ Continue the use of Best Management Practices for all activities at the school and at the athletic field. Consider drought resistant grasses and/or low release nutrient fertilizers in the IWPA, as required.
- ✓ Investigate Integrated Pest Management and Best Management Practices within the IWPA as necessary.
- ✓ Use secondary containment for any petroleum products kept for maintenance and lawn care equipment.
- ✓ Use Best Management Practices for handling treatment chemicals and vehicles used to access the area. Do not use or store pesticides, fertilizers or deicing materials within Zone I.
- ✓ Review your emergency response plan regarding accidental releases within the area. Ensuring that emergency responders in town are aware of the locations of your resource areas.
- ✓ Refer to the Massachusetts Public Health Associations Healthy Schools website online at http://www.mphaweb.org/pol_schools.html for additional information.

4. Fuel Oil Storage – Underground Storage Tank (UST) – Although the UST fuel oil tank is outside of the protection areas, the UST can pose a potential threat to the water supply. If managed improperly, underground storage tanks and the associated fuel oil lines can be a potential source of contamination due to leaks or spills of the chemicals they store.

Recommendations:

- ✓ Any modifications to the UST must be accomplished in a manner consistent with Massachusetts plumbing, building, and fire code requirements. Consult with the local fire department for any additional local code requirements regarding USTs.
- ✓ Monitor deliveries of oil as many spills are related to delivery.

5. Agricultural Activities – There is agricultural activity in an adjacent field within the IWPA of the well. The field is used to grow corn for a dairy farm and pesticides are applied by a licensed applicator. The licensed applicator is responsible for complying with regulations regarding application of products within the IWPA of the school well.

Recommendations:

- ✓ Attempt to obtain an agreement from the farm owner/operator that they will:
 - Follow all applicable UMASS recommendations on Integrated Pest Management.
 - Become certified in UMASS/Natural Resource Conservation Service Nutrient Management Certification program.
 - Obtain and follow a Farm Plan through Natural Resource Conservation Service. Alternatively, complete and follow a plan developed through the publication *On Farm Strategies to Protect Water Quality: An Assessment and Planning Tool for Best Management Practice*.

- ✓ Continue working with the commercial farmer in your protection area. Encourage the use of a USDA Natural Resources Conservation Service (NRCS) farm plan to protect water supplies. If they are not currently working with NRCS and DAR, suggest that they review the fact sheet available online and call the local office of the NRCS in Hadley at 413-585-1000 for assistance or online at <http://www.nrcs.usda.gov/programs/farmbill/2002/pdf/EQIPFct.pdf>.
- ✓ Encourage farmers to incorporate an Integrated Pest Management (IPM) approach into their pest management program. IPM is an ecologically-based approach to pest control that links together several related components, including monitoring and scouting, biological controls, mechanical and/or other cultural practices, and pesticide applications. By combining a number of these different methods and practices, satisfactory pest control can be achieved with less impact on the environment.
- ✓ Continue your current work with farmers, to ensure that pesticides and fertilizers are being stored within a structure designed to prevent runoff.
- ✓ The USDA has various funding sources for government agencies, non-government organizations and agricultural facilities through programs such as those listed on the USDA web site <http://search.sc.egov.usda.gov/>. One program in particular, the Environmental Quality Incentives Program (EQIP), may be utilized in a variety of projects from DPW stormwater management to farm nutrient management designed to protect surface and groundwater. Review the fact sheet available online at <http://www.nrcs.usda.gov/programs/farmbill/2002/pdf/EQIPFct.pdf> and call the local office of the NRCS for assistance.

Implementing the following recommendations will reduce the system's susceptibility to contamination.

3. Protection Recommendations

Implementing protection measures and best management practices (BMPs) will reduce the well's susceptibility to contamination. The school is commended for replacing the old well with one that is fairly remote from the school and for not using pesticides and fertilizers on its athletic fields. The water supplier should review and adopt the key recommendations above and the following:

Priority Recommendations:

- ✓ Monitor fuel oil delivery and boiler room floor drains.

Zone I:

- ✓ Keep non-water supply activities out of the Zone I.
- ✓ Post the Zone I area with "Public Drinking Water Supply Recharge Area" signs at appropriate locations away from the actual well.
- ✓ Consider well relocation if Zone I threats cannot be mitigated or if water quality is impacted by activities.
- ✓ If it's not feasible to purchase privately owned land within the Zone I at this time, consider a conservation restriction that would prohibit potentially threatening activities or a right of first refusal to purchase the property.

Training and Education:

- ✓ Train staff on proper hazardous material use, disposal, emergency response, and best management practices; include custodial staff, groundskeepers, certified operator, and food preparation staff. Post labels as appropriate on raw materials and hazardous waste.
- ✓ Post drinking water protection area signs at key visibility locations away from the actual well.
- ✓ Incorporate groundwater education into the school curriculum.
- ✓ Work with your community to ensure that stormwater runoff is directed away from the area and is treated according to DEP guidance.

Facilities Management:

- ✓ If it is feasible in the future, consider upgrading the heating system to propane for the purpose of removing fuel oil storage from the school.
- ✓ Implement Best Management Practices (BMPs) for the use of fertilizer, herbicides and pesticides on school property.
- ✓ Septic system components should be located, inspected, and maintained on a regular basis.
- ✓ For utility transformers that may contain PCBs, contact the utility to determine if PCBs have been replaced. If PCBs are present, urge their immediate replacement. Keep the area near the transformer free of tree limbs that could endanger the transformer in a storm.

Planning:

- ✓ Work with local officials in town to include the facility IWPA in Aquifer Protection District Bylaws and to assist you in improving protection.
- ✓ Have a plan to address short-term water shortages and long-term water demands. Keep the phone number of a bottled water company readily available.
- ✓ Supplement the SWAP assessment with additional local information and incorporate it into water supply educational efforts. Use a land use inventory to assist in setting priorities, focusing inspections, and creating educational activities.

Funding:

The Department's Wellhead Protection Grant Program provides funds to assist public water suppliers in addressing Wellhead protection through local projects. Protection recommendations discussed in this document may be eligible for funding under the "Wellhead Protection Grant Program". For additional information, please refer to the attached program fact sheet. If funding is available, each program year the Department posts a new Request for Response for the Grant program (RFR). Other funding opportunities are described in "Grant and Loan Programs: Opportunities for Watershed Protection, Planning and Implementation" at <http://www.state.ma.us/dep/brp/mf/files/glprgm.pdf>.

These recommendations are only part of your ongoing local drinking water source protection. Citizens and community officials should use this SWAP report to encourage discussion of local drinking water protection measures.

4. Attachments

- Map of the Public Water Supply (PWS) Protection Areas
- Recommended Source Protection Measures Fact Sheet
- Your Septic System Brochure